

CLAIMS:

1. A child locating system comprising a child locating device, and a further device carried or worn by a child, the further device comprising transmission means for transmitting an electromagnetic signal towards said child locating device,
said child locating device comprising:
at least three spaced antennas for receiving said electromagnetic signal;
switching means for switching the at least three antennas in such a way as to obtain a Doppler effect;
processing means for processing the electromagnetic signal as received by the antennas; and
outputting means for producing an output indicative of the direction of the further device with respect to said child locating device.
2. A locating system according to claim 1, wherein the locating device comprises at least four spaced antennas.
3. A locating system according to claim 1 or claim 2, wherein the antennas are unidirectional antennas and the angular ranges covered by neighbouring antennas overlap.
4. A locating system according to any preceding claim, wherein the locating device further comprises distance determining means for determining the distance between the locating device and the further device, and wherein the outputting means is arranged to produce an output indicative of the distance between the locating device and the further device.
5. A locating system according to claim 4, wherein the distance determining means comprises means for causing one of said antennas to transmit a further electromagnetic signal towards the further device, means for causing one of said antennas to receive a return signal from the further device, time measuring means for measuring the time between transmission of the further signal and receipt of the return signal, and

estimating means for estimating the distance between the locating device and the further device based on the measured time.

6. A locating system according to claim 5, wherein the means for causing one of said antennas to transmit the further signal is arranged to cause that antenna which is closest to the further device to transmit the further signal.

7. A locating system according to any preceding claim, wherein the outputting means comprises a display for displaying the direction of the further device with respect to the locating device.

8. A locating system according to claim 7 as dependent on any one of claims 4 to 6, wherein the display is further arranged to display the distance between the locating device and the further device.

9. A locating system according to any of claims 4 to 6 or 8, or claim 7 as dependent on any of claims 4 to 6, wherein the locating device further comprises notifying means for notifying a user of the locating device if the distance between the locating device and the further device is larger than a predetermined value.

10. A locating system according to any preceding claim, wherein the locating device further comprises means for alerting a user of the locating device if no electromagnetic signal is received from the further device.

11. A locating system according to any preceding claim, wherein the locating device further comprises means for causing one of said antennas to transmit an initial electromagnetic signal which is arranged to cause the further device to transmit said electromagnetic signal.

12. A locating system according to any preceding claim, wherein the further device is arranged to transmit battery charging level information to the locating device, and the

outputting means is arranged to produce an output indicative of the battery charging level of the further device, based on the battery charging level information.

13. A locating device for use in a locating system comprising said locating device and a further device, the further device comprising transmission means for transmitting an electromagnetic signal towards said locating device, the electromagnetic signal having a signature associated with the further device;

said locating device comprising:

signature storage means for storing a representation of the signature of the further device;

at least three spaced antennas for receiving said electromagnetic signal;

switching means for switching the at least three antennas in such a way as to obtain a Dopplercant effect;

processing means for processing the electromagnetic signal as received by the antennas so as to detect the signature of the received signal, and to compare the signature as detected with the representation of the signature as stored;

and outputting means for producing, if the signature as detected corresponds to the representation of the signature as stored, an output indicative of the direction of the further device with respect to said locating device.

14. A locating device according to claim 13, comprising at least four spaced antennas.

15. A locating device according to claim 13 or claim 14, wherein the antennas are unidirectional antennas and the angular ranges covered by neighbouring antennas overlap.

16. A locating device according to any of claims 13 to 15, further comprising distance determining means for determining the distance between the locating device and the further device, wherein the locating device is arranged to produce an output indicative of the distance between the locating device and the further device.

17. A locating device according to claim 16, wherein the distance determining means comprises means for causing one of said antennas to transmit a further electromagnetic signal towards the further device, means for causing one of said antennas to receive a return signal from the further device, time measuring means for measuring the time between transmission of the further signal and receipt of the return signal, and estimating means for estimating the distance between the locating device and the further device based on the measured time.
18. A locating device according to claim 17, wherein the means for causing one of said antennas to transmit the further signal is arranged to cause that antenna which is closest to the further device to transmit the further signal.
19. A locating device according to any of claims 13 to 18, wherein the outputting means comprises a display for displaying the direction of the further device with respect to the locating device.
20. A locating device according to claim 19 as dependent on any one of claims 16 to 18, wherein the display is further arranged to display the distance between the locating device and the further device.
21. A locating device according to any of claims 16 to 18 or 20, or claim 19 as dependent on any of claims 16 to 18, further comprises notifying means for notifying a user if the distance between the locating device and the further device is larger than a predetermined value.
22. A locating device according to any of claims 13 to 21, further comprising means for alerting a user if no electromagnetic signal is received from the further device.
23. A locating device according to any of claims 13 to 22, further comprising means for causing one of said antennas to transmit an initial electromagnetic signal which is arranged to cause the further device to transmit said electromagnetic signal.

24. A locating device according to any of claims 13 to 23, arranged to communicate with two or more said further devices, wherein the signature storage means is arranged to store the signatures of each further device, the signatures of each further device being different, and wherein the outputting means is arranged to produce an output indicative of the direction and/or the distance of each further device with respect to the locating device.

25. A locating device according to claim 24, wherein the outputting means is arranged to produce simultaneously for each further device an output indicative of the direction and/or the distance with respect to the locating device.

26. A locating device according to claim 24, further comprising means for enabling a user to select a said further device, and wherein the outputting means produces an output indicative of the direction and/or the distance for the selected further device with respect to the locating device.

27. A locating device according to any of claims 13 to 26, wherein the locating device is arranged to receive battery charging level information from the or each further device, and the outputting means is arranged to produce an output indicative of the battery charging level of the or each further device, based on the battery charging level information.

28. A locating system comprising the locating device according to any of claims 13 to 27, and one or more said further devices.

29. A locating system according to claim 28, wherein a said further device is arranged to be carried or worn by a person, preferably a child.

30. A method of determining, by means of a locating device, information indicative of the direction of a child with respect to said locating device, the child wearing or carrying a further device, the method comprising:

transmitting an electromagnetic signal from the further device towards said locating device;
receiving said electromagnetic signal at said locating device, using at least three spaced antennas which are switched in such a way as to obtain a Dopplercant effect;
processing the electromagnetic signal as received by the antennas; and
producing an output indicative of the direction of the further device with respect to said locating device.

31. A method of determining, using a locating device, information indicative of the direction of a further device with respect to said locating device, the method comprising:

storing a representation of a signature associated with the further device in said locating device;
transmitting an electromagnetic signal from the further device towards said locating device, the electromagnetic signal including the signature associated with the further device;
receiving said electromagnetic signal at said locating device, using at least three spaced antennas which are switched in such a way as to obtain a Dopplercant effect;
processing the electromagnetic signal as received by the antennas so as to detect the signature of the received signal;
comparing the signature as detected with the representation of the signature as stored; and
if the signature as detected corresponds to the representation of the signature as stored, producing an output indicative of the direction of the further device with respect to said locating device.

32. A method according to claim 30 or 31, wherein at least four spaced antennas are used to receive said electromagnetic signal.

33. A method according to any of claims 30 to 32, comprising using unidirectional antennas, wherein the angular ranges covered by neighbouring antennas overlap.

34. A method according to any of claims 30 to 33, further comprising determining the distance between the locating device and the further device, and producing an output indicative of the distance between the locating device and the further device.

35. A method according to claim 34, wherein determining the distance comprises transmitting a further electromagnetic signal from one of said antennas towards the further device, receiving a return signal from the further device at one of said antennas, measuring the time between transmission of the further signal and receipt of the return signal, and estimating the distance between the locating device and the further device based on the measured time.

36. A method according to claim 35, wherein the further signal is transmitted from that antenna which is closest to the further device.

37. A method according to any of claims 34 to 36, comprising displaying the distance between the locating device and the further device.

38. A method according to any of claims 34 to 37, further comprising notifying a user of the locating device if the distance between the locating device and the further device is larger than a predetermined value.

39. A method according to any of claims 30 to 38, comprising displaying the direction of the further device with respect to the locating device.

40. A method according to any of claims 30 to 39, further comprising alerting a user of the locating device if no electromagnetic signal is received from the further device.

41. A method according to any of claims 30 to 40, further comprising transmitting towards the further device an initial electromagnetic signal which is arranged to cause the further device to transmit said electromagnetic signal.

42. A method according to claim 31 or any of claims 32 to 41 as directly or indirectly dependent on claim 31, comprising storing the signatures of two or more said further devices, the signatures of each further device being different, and producing an output indicative of the direction and/or the distance of each further device with respect to the locating device.

43. A method according to claim 42, comprising producing simultaneously for each further device an output indicative of the direction and/or the distance with respect to the locating device.

44. A method according to claim 42, further comprising enabling a user to select a said further device, and producing an output indicative of the direction and/or the distance for the selected further device with respect to the locating device.

45. A method according to any of claims 30 to 44, further comprising transmitting battery charging level information from the or each further device to the locating device, and producing, at the locating device, an output indicative of the battery charging level of the or each further device, based on the battery charging level information.

46. Use of a Dopplercant technique in a child locating device which is arranged to receive a signal transmitted by a further device carried or worn by a child.

47. A locating device, a system, a method or a use, substantially as herein described with reference to, or as illustrated in, the accompanying drawings.